PAVE Science Flight Report
27 January 2005

Flight Plan

Fly northwest to pick up the Aura MLS track south of Hudson Bay (49˚N, 81˚W). Proceed north along north and west along the track until 73˚N, 101˚W. Travel east to Resolute, coincident with a sonde launch. Turn back south toward Pease.

MLS overpass will occur along our track at 66˚N and 92˚W at 18:28 GMT. This point is just inside the vortex. There is the possibility of PSCs at the northern end of the track. No sun run on this flight. Estimated flight length 10 hrs.

Report

Takeoff was delayed to 14:39 GMT (plan was 14:16) due to problems with the ASUR Dewars not reaching liquid helium temperature. After some discussion, ASUR decided not to fly. Leveled out at 34 kft (pressure) – about 1 km above tropopause according to MTP. There were broken clouds below at 1 km. The SAGA instrument reported 1 ppb of HNO_3, 395 ppb ozone. Ozone amount increased at 19 km as we approached the base of Hudson Bay. Joined the Aura track (53º27'N, 83º05'W) at 16:37. There was haze over Hudson Bay with some high cirrus as we got to the northern end. We were about 10 minutes late to the Aura (MLS) overpass waypoint 8. AROTAL and DIAL data showed evidence of ozone loss as we passed into the vortex. Then, as we got further into the vortex, ozone began to rise again. Estimated ozone loss of about 1ppm at 20 km. AROTAL reported temperatures of 198K at 22 km and zenith angles of 91º. We turned east toward Resolute about 19:45. We decided to fly beyond Resolute for five minutes for the extended run. DIAL saw depolarization at 18 km near Resolute, with AROTAL seeing 195K. We overflew Resolute and the NAT disappeared. The aircraft exited the depleted region at 65˚N. Coming out of the vortex, we saw very high ozone (>5 ppm) above 25 km. We saw high values of HNO_3 and ozone as we came south out of the vortex. The total flight time was ~9.8 hours.

Instrument Status

AROTAL	McGee	Good flight – nice data as we entered the vortex, fair amount of depletion. Good temperature data from 26 km to the airplane at 91º SZA. Temperature data collaborated with DIAL PSC data.
DIAL	Browell	Good/excellent flight – saw entry into vortex and exit. Saw Type 1a (solid) PSCs. There was a lot of structure below the aircraft in ozone.
FTS	Coffey	No sun run (sorry Mike)
CAFS	Shetter	Running fine
MTP	Mahoney	Worked well
ASUR	Notholt	Did not fly (see explanation above)
Nadir CO_2	Heaps	Working fine – took data on the first half (sunlit)
FastOZ	Avery	Good flight – saw 1ppm, lots of structure

DACOM	Diskin	Good flight
DLH	Diskin	Good flight – saw down to 5ppm
SAGA	Dibb	Worked fine. During the last hour, tracked with FastOZ and saw up to 5 ppb of HNO_3.
TD-LIF	Cohen	Did not run at full power, but took data all the way. Did not see much NO_2.
ICATS	Yarbrough	Worked fine
COBALT	Podolske	Worked well